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ABSTRACT

The role of the British Broadcasting Corporation (BBC) in supplying television educators with teacher aids, models, and devices is described in this report, which emphasizes the work of special effects or visual effects technicians and explains how difficult concepts and principles can be demonstrated through the use of three-dimensional models, demonstrations, and computer-linked devices. Comparisons are made between educational and non-educational television and the film industry. Additional topics addressed include the organization and history of the departments of visual effects within the BBC, the training of technicians, and the use of visual effects in educational television and the Open University. Examples of models and demonstrations developed are provided, as well as a list of services offered to Open University program developers and discussions of the skills required by the special effects technician; models, model making, and demonstrations; table top models and the new technology, including the use of endoscopes, periscopes, and computer graphics; and uses of visual effects in drama production. (LMM)

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SPECIAL EFFECTS AND THEIR PERHAPS UNUSUAL USE IN EDUCATIONAL TELEVISION

(AN ILLUSTRATED PAPER)

BY

GERALD ABOUAF FRSA

As submitted to the Educational
Television Association
on the occasion of
the 1983 ETA Conference
held at the
UNIVERSITY OF YORK 1983

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A B S T R A C T

Although "Special Effects" have been a feature of film making since the days of silent movies, they have only comparatively recently become familiar and recognisable to the general public, through the works of Effects Designers on films such as "2001 A Space Odyssey", "Star Wars" and Stephen Spielburgs "ET".

In this paper, Gerald Abouaf, FRSA, the Head of BBC Television's Effects Unit serving Educational Television and the Open University in Britain, relates how since 1971 BBC Special Effects Technicians have quite unusually, been adapting skills normally used in films and General Service TV, to educate at degree level through the media of Television.

Mr Abouaf explains how difficult concepts and principles can be explained and demonstrated through the use of three-dimensional models, demonstrations and compu linked devices.

He makes comparisons between educational and non-educational television and the film industry, and describes the training of Technicians.

The lecture is illustrated with Video Sequences showing examples of the Effects mans craft.

INTRODUCTION (1)

Thirteen of my fifteen years service with the British Broadcasting Corporation have been totally occupied with educating at Degree level, and the establishing/development of BBC Departments, to supply Television Educators with aids to teaching.

In 1970 I was a founder of the BBC Visual Effects Department formed to service the new Open University's programmes from Alexandra Palace in London.

In 1984 I head that same Department, but now from the Campus of the University in Buckinghamshire.

My brief has always been to provide, for the Open University, all those services usually expected of a Special, or Visual, Effects Department outside Education but, in addition, to provide teaching aids, models, devices and demonstrations which are peculiar to the needs of the Open University and its television programmes.

The very diversity of OU teaching is responsible for the dual role of my Department and for the wide range of skills necessary to maintain that role.

My experience in Television Education and the Arts has made me somewhat of an authority in my field. Accordingly I receive invitations from various bodies outside the BBC to lecture and assess.

I also receive mail on a variety of associated subjects from the viewing public, containing questions, mostly of a technical nature, which I endevour to answer.

I have a particular interest in young people studying model making, associated crafts, and artistic subjects in general.

To foster this interest I encourage co-operation between the BBC and College Industrial Release Schemes. Through such schemes, several students have been able to gain valuable front line experience of working in Industry.

My interests extend to Television Organisations abroad and whilst on leave I have visited Organisations in France and the West Indies. Now that I have introduced myself, I would like to tell you something about my work...

INTRODUCTION (2)

For many years the work of the Special Effects Technician in films was, to the general public, a rather unknown quantity.

When credits rolled at the end of a film the interested viewer might notice one crediting a contribution or contributions by a Special Effects Designer, but he or she might have difficulty identifying precisely which part of the film actually contained Special Effects.

The Effects Technicians anonymity stems partly from the nature of his work, mainly behind the scenes, and the viewers natural tendency not to disturb enjoyment or concentration to question how various events in a film were contrived.

In recent years, however, things have changed. A plethora of Science Fiction films have brought our Effects Man into the limelight, and names like Ray Harryhausen and Douglas Trumbull are as well known today as those of the Film Producers. It's interesting but the majority of model making Students now leaving Art Colleges, want to be in Special Effects. This shows to what extent the craft has become known and recognised as one of the most creative areas of films and TV.

Incidentally at this juncture I think I should explain that "Special Effects" - the description given to our kind of work by the film industry - are better known in the BBC as "Visual Effects", the products the same only

the title has changed. This change of title helps differentiate within the BBC and elsewhere, between departments which could have similar titles but completely different functions. For instance, there is a Special Effects Department in the BBC which is devoted to sound effects, there is also another department concerned with digital video and a whole range of electronically conceived "Special Effects" which owe nothing to any person, other than the operation of the computerised system producing the Electronic images.

MILTON KEYNES BUCKINGHAMSHIRE
THE BBC PRODUCTION CENTRE TODAY

DEPARTMENTS OF SPECIAL OR "VISUAL" EFFECTS IN THE BRITISH BROADCASTING CORPORATION

The BBC, compared with commercial televison companies, is unique in having two "In House" Visual Effects Departments to feed its seemingly unquenchable appetite for divers items and devices "tailor made" for televison and unobtainable from any other source.

The larger of the two units is based centrally in London and at the time of writing numbers some eighty or more staff, plus clerical back-up. This department's work-load will come mainly from the Drama and Light Entertainment areas of the BBC centrally, but, it can also include requests from Schools Television, The Natural History Unit and BBC Regional Network Production Centres across the UK.

The smaller unit of ten staff for which I am responsible is devoted to the requirements of The Open University and is based on the Campus of the University, at Milton Keynes in Buckinghamshire. We differ from the parent department in one respect only and that is in our commitment to the Open University. When occasionally troughs in OU requirements leave spare resources our services are offered to General Service Production departments in London and the Regions.

Work is carried out by teams of a Designer and one or more Assistants. Each team will work on one or more programmes at a time in Studio or on location for film or video recording.

VISUAL EFFECTS IN EDUCATIONAL TELEVISION AND THE OPEN UNIVERSITY

The first transmissions of the Open University in the 1970's were in black and white - colour being introduced later.

The BBC/OU Production Unit making these early programmes from Alexandra Palace in North London was pioneering in that its partnership with the University was an entirely new concept. Apart from some staff in the Servicing Departments of the BBC Unit, the Producers, Directors and Production staff were in the main, newcomers from educational fields outside television, who after periods of television training were into the deep end of programme making.

Funding for programme making and resources came not from the usual BBC source, the Licence Fee, but from the Open University, in combination with the Department of Education and Science.

Many early Studio based OU programmes had a school room look about them as resources were limited at that time. The most common format for the Studio was a Presenter placed within a fairly basic set against a background of graphics boards on stands.

It was soon realised, in fact within less than 2 years, that there were subjects contained within courses that could only satisfactorily be explained and explored with the aid of 3-dimensional demonstrations and models.

A Visual Effects model maker and Effects Technician was seconded to the OU Unit and within days of his arrival was inundated with requests for models and demonstrations.

So numerous were these requests that he was compelled to sub-contract work to other model makers in order to meet programme deadlines.

One Producer for example, required a model of a sea cucumber, another a working model showing the upwelling of the ocean floor due to volcanic activity. Other requests ranged from velocity of light experiments to molecular models and biological cell structures. In fact, a multitude of subjects were covered.

The sea cucumber model was to demonstrate in 3-dimensions, the water hydraulics system operating the many tube feet. Sections of the outer body were to be removable to reveal features of the system and some tube feet were to be seen to operate, as in reality.

As the model was several times larger than life, all these features could be shown and easily explained.

The introduction of models and demonstrations was certainly instrumental in lifting programmes out of the ordinary. Of course, since those early days there have been many technological advances which have further enhanced the visual image and aided television teaching but the model and the Visual Effects Technician continue to have a vital role to play.

One of the central issues which claims visitors' attention is how a professional broadcasting organisation can work in harmony with a university to produce a learning package which proves satisfactory for a mature home-based student, who may have no previous experience of academic study. The answer lies in mutual planning. On the one hand the University draws strength from the BBC's long experience in educational broadcasting. On the other the BBC accepts that the staff of the University must devise and control the academic content, policy and objectives of the University's course material.

The Planning Committee, which prepared the way for the University, approved the following definition of the terms of the University / BBC partnership and published it as an appendix to its final report:

'The radio and television programmes, required by the University and provided by the BBC, are to be planned on the basis of an educational partnership between University and BBC staff. In practice, this partnership will extend over the whole range from the conception of the course to the final production of the programmes. The success of this partnership rests on the recognition by both parties that, while effective education is the overriding objective, and the ultimate responsibility of the University under its Charter, each has a specific professional role to play. The University will prescribe the academic objectives and general character of the broadcasts, in relation to the other component parts of each course, while the BBC will provide the necessary presentation and production skills. In the overlapping area – where the interrelationship of content and presentation is worked out – a reasonable degree of flexibility on both sides is essential in order to secure the proper concern of the academic staff and the fullest use of the experience of the broadcasting staff. Within this area, such matters as the choice of principal academic contributors to programmes and the interconnection of subject instruction and broadcasting method will be of first importance to both partners. While the BBC recognises the right of the Open University finally to determine any such points that may be at issue, the University agrees that full participation of BBC staff in all discussions pertaining to these matters is a necessary condition of working effectively together. The key relationship between contributors and production staff jointly engaged in producing material and programmes for broadcasting will thus be secured.'

The oldest studio

Alexandra Palace in London, home of the first television studios in the world, is now linked with the newest university campus in England, at Milton Keynes in Buckinghamshire,

The newest university

Together they offer a new opportunity for adults throughout the country to study for degree qualifications through the media of integrated television, radio and specially designed correspondence courses.

Student numbers are now approaching 50,000 and are expected to reach that figure in 1976.

This booklet looks at the partnership through the eyes of the BBC.

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AREAS COVERED BY THE OU UNIT

In the 1980's, the sky seems to be the limit. Here is a list of the services we offer Open University programme making.

1 Computer controlled devices and demonstrations requiring advanced and purpose built electronics.

2 Three dimensional models. Static and animated.

3 Mechanically operated teaching aids.

4 Reproductions of Pterodactyls, early Hominid bones and skulls, Molluscs etc.

5 Geographical and Geological models of surfaces, terrain and substructure.

6 Mathematical models, explaining concepts of Mathematics, Topology and Statistics.

7 Demonstrations of Scientific Principles, Physics, Chemistry and Biology.

8 "Special Effects" for inclusion in Arts and Drama Courses. Including Elemental Effects, such as smoke and fire, explosive effects, special props.

Irrespective of background, all Designers and Assistants must be able to produce working drawings, operate machinery and be capable of constructing in all manner of materials.

They must be articulate, intelligent, capable of taking briefings from academics and translating these into 3-dimensional visual aids, etc.

As far as specialities are concerned, our staff at Milton Keynes number, amonst other skills, the following:-

Sculpture

Physics and Chemistry

Computer Programming, Assembly and Operation

Electronics

Fine Arts

Graphics

3-dimensional Design and Model Making

Furniture Design

Pyrotechnics and the operation of Special Effects equipment used in film making

Wood Working and Construction in Metal and Plastics

The training of Special Effects Man in television is virtually the same as his opposite number in film. His background is often the same and his skills and techniques are the same. In fact, the film Effects Man may well have started in televison.

Perhaps the only major difference between the two, is in the time each has to produce the end product.

This was very well illustrated by JOHN SCHLESINGER, the film Producer, when, returning to the BBC after an absence of some years, he described the BBC schedule as something of a shock after the more generous time schedule of film making.

TRAINING

TRAINING OF TECHNICIANS

The BBC quite rightly places a great deal of emphasis on safety in the training of Visual Effects Technicians.

Proficiency must be proved in the handling of machinery, hand tools, and other devices associated with the craft.

If accidents are to be avoided and guide lines provided by the Health and Safety Executive adhered to, it is vital that any training on machinery is carried out by qualified instructors, with written certification at the end of the training course that the trainees have achieved the standard required.

Even long serving Technicians could have acquired bad or even dangerous machinery handling habits, a short period of re-training will help eliminate any wrong practices.

Pyrotechnics are used by Effects Technicians and it is vital that instructors be qualified in the handling, and familiar with the chemical composition of explosive mixtures. Film and televison effects often require the use of explosive devices which are designed to suit a particular situation. In such an instance a stock pyrotechnic device might be unsuitable, and a Technician may have to make his own 'package'. This is when it is important he knows what he is doing and has received the right kind of training from an instructor familiar with the requirements of Film or Television.

BBC pyrotechnics training takes place on the Army Weapons Training Ground in Hampshire and elsewhere as required.

Under the supervision of an Instructor experienced in the use of Pyrotechnics for Television, Staff from the departments of London and the Open University are able to familiarise themselves with the entire range of explosive devices and materials available.

One-day training and refresher courses take place throughout the year. Refresher courses are important particularly to the Open University Staff, as their use of Pyrotechnics in Educational Television will usually be less frequent than of their colleagues in London.

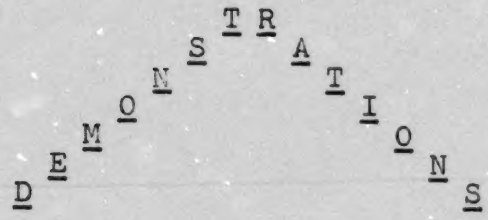
Generally, when recruiting Effects Staff other than Specialists, say in Electronics, the BBC requires that the applicant show proof of some artistic ability in the form of an Art College Diploma or a BA in three-dimensional design.

This is just the beginning, a great deal of knowledge will be acquired working in the job itself and only time will make the professional.

MOVE TO VIDEO OF TRAINING.

MODELS, MODEL MAKING

AND



MODELS AND MODEL MAKING

In this aspect of our work, we obey four basic rules:-

1 The camera is going to look closely at the model, therefore, the detail and finish must be good, and clearly make the teaching point.

2 Care must be taken when using reflective materials, shiny surfaces could cause flare.

3 The model should be "Presenter proof", that is, must be strong enough to withstand constant handling during rehearsals and recordings.

4 Mechanically driven models should be as quiet as possible, in order to allow the Presenter's voice to be heard.

I would like to show you now some examples of demonstration models.

Our brief for the first model you will see was that we should provide for a programme on Illusion, a section of night sky, which could be matted into the sky on a studio set.

The idea behind this was that when the actors pointed at the sky, a group of stars would appear to move and form the words, "God rules OK".

We did this by placing white discs on a sheet of black perspex in a random fashion, then pulling these discs

across the surface and into position by the lowering of lead weights attached to each "star".

The action of the model was then recorded on Video Rostrum, and superimposed on the black background of the Studio.

VIDEO SEQUENCE OF SIR FRANCIS DRAKE HIGHWAY MODEL

In this sequence, you will be seeing an electronically driven working model - literally a scaled down reconstruction of subterranean forces, which in 1906 fractured the Sir Francis Drake Highway, north of San Francisco, California.

Movement of the earths Techtonic Plates in opposite directions across the San Andreas fault, fractured the highway at the intersection of the fault line.

Scientists believe that a phenomenon they call "Elastic re-bound" is responsible for earthquakes.

The model shows how this re-bound took place by reproducing in miniature the forces involved.

Watch how the road stresses and curves before finally breaking into its offset position.

Actually, the road after breaking was offset by 6.5 metres.

TABLE TOP MODELS

Table top models (or teaching aids) are what the description implies. They are not suitable for, nor intended to be, floor standing but are displayed on a table or studio block, at an average working height of three feet from the floor.

They should be of a size and configuration that can be easily handled by a Presenter, standing behind or at the side of the table or block. It is important for the Presenter to be able to reach or point to all parts of the model without obstructing camera vision or moving out of shot. Placed out of vision behind the table or block, on say, a shelf, could be components of the model which need to be added during recording.

In educational television many subjects are taught this way, particularly Mathematics, which is made so much more memorable through the use of models, particularly in the areas of solid geometry and associated 3-dimensional mathematical figures. An advantage of the table top model is the flexibility it allows the camera, which can move around the model or above it. The Presenter and model can be combined in a two shot with graphics boards or some other suitable background behind to make an interesting visual story.

The model on the table need not be static, it can be placed on a turntable, operated manually by the Presenter, or the turntable could be of the sophisticated variety

electronically controlled to move at variable speeds and stop precisely on a pre-determined position.

There are companies in the UK who will supply small electric turntables, for shop window displays of jewellery, cakes etc. However, I have not yet discovered an organisation which will supply or build the kind of precision electronic table I have been describing, although I would have thought there is certainly a market for this kind of device, at least in the UK.

The electronic turntables used by my own Department were purpose built by our own electronics specialist and can be linked to a computer. It is often desirable and useful for a Studio set-up to include more than one turntable in order to display several models. The electronic turntables therefore could be synchronous, all turning at the same but variable speed, giving the opportunity to mix or cut from model to model, or to superimpose picture over picture while the models rotate.

Lets see some examples of table top models.

TABLE TOP MODELS AND NEW TECHNOLOGY

THE ENDOSCOPE

There are, of course, many ways in which models can be utilised in a Studio setting. New technology has brought new ways of looking at models and a flexibility previously impossible with conventional methods.

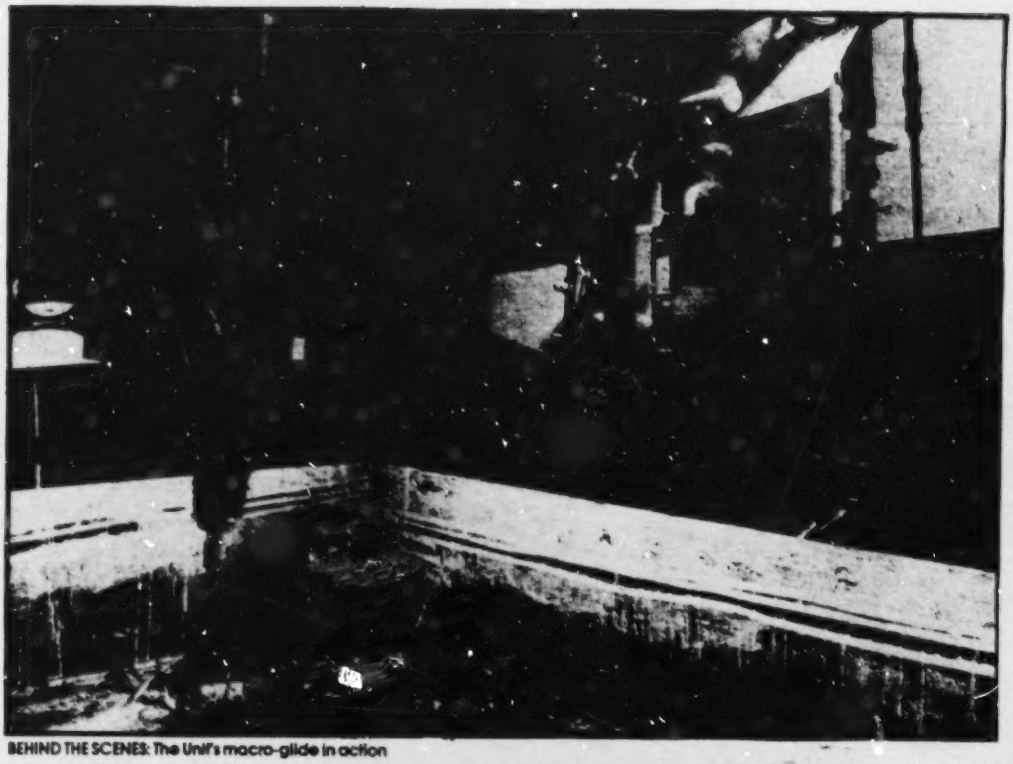
For instance, the video camera mounted on a pedestal, or film camera on a track mounting, can move around the model and focus onto surface detail.

However, it may be unable to enter inside and examine the interior without the facility to remove sides. Even with sides removed it may be difficult to light the model for interior shots.

One answer to this kind of problem could be the Endoscope. This is a device used by Industry and the medical profession for inspection of areas with limited accessability. Obtainable in rigid or flexible form, the rigid version contains a series of lenses and the flexible, glass optical fibres. Being flexible, the latter enables the user to see round corners and to probe into difficult areas, such as the human body or an aircraft engine.

The endoscope carries its own illumination via liquid light guides or it is transmitted through fibre optics alongside the endoscope.

A recent derivation of the endoscope is the modelscope. This rigid device is being used primarily by Architects, to view prospective buildings whilst still in model form.



BEHIND THE SCENES: The Unit's macro-glide in action

Television Weekly October 12, 1984

BBC BRISTOL NATURAL HISTORY
UNIT - ENDOSCOPE IN USE

The modelscope is fitted with small wheels at the business end enabling it to be wheeled across the floor of models. There is also an adjustment allowing the operator to adopt a viewpoint or eyeline equivalent to that of an observer walking within an actual building.

The modelscope can be linked to film, video, or stills cameras.

There is some difference in the image produced by the rigid compared with the flexible endoscope. The flexible produces a round vignetted image whereas the rigid produces the more usual 4 x 3 format.

Depending on requirements, results with either version can be quite surprising and the BBC, particularly the Natural History Unit in Bristol, have had considerable success using endoscopes to study miniature wildlife and in particular, burrowing animals.

THE PERISCOPE

This is yet another device available to model makers. Tele-Visual of Richmond, England, have refined and adapted this old idea and produced a most sophisticated unit which rotates through 360 ^{o} retaining an upright image in all operating positions. It has excellent resolution with no vignetting of the picture.

Ideal for macro close-up video photography it could be a useful tool for the model maker, enabling overhead or ground level shots to be taken with ease.

THE FUTURE (COMPUTERS)

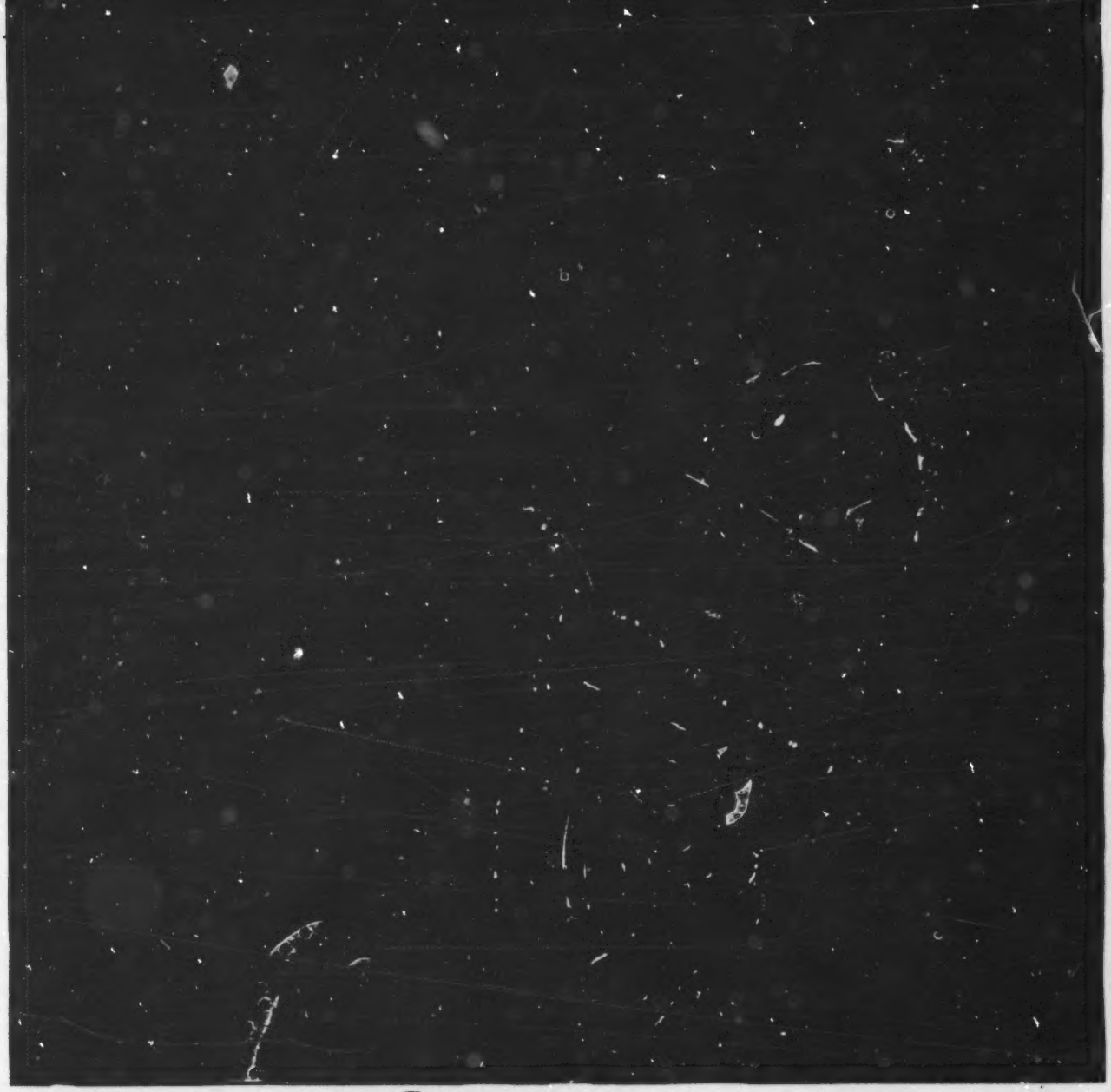
Quantum advances are being made in the area of computer generated special effects, particularly in America. 3-dimensional images are being produced which are indistinguishable from the best of hand made models.

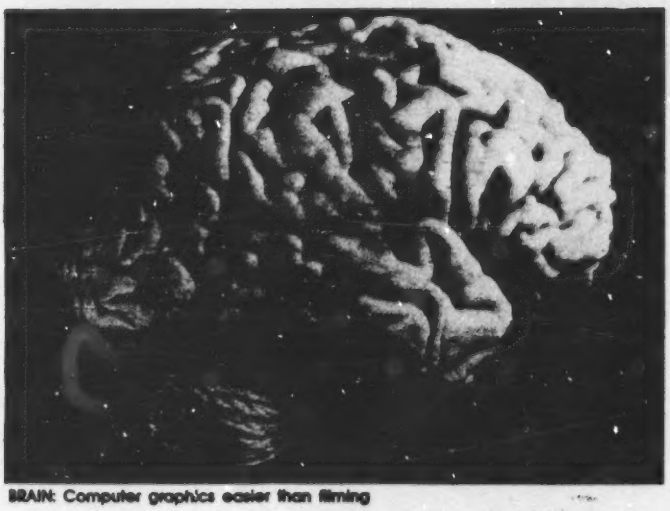
These images are not just static, for instance, CRANSTON-CSURI PRODUCTIONS of Columbus, Ohio, through their department of Computer Graphics, have successfully produced 3-dimensional images which rotate through 360 °. The images are full colour representations of the bodys' internal organs, including beating heart and lungs.

future use of the images could be in a library used by doctors and surgeons to explain surgery, etc, to patients.

Again in America, a film, "The Last Starfighter", includes computer generated images of futuristic spacecraft in flight that are unbelievably realistic. No models were used and no motion control photography - just computers.

DIGITAL PRODUCTIONS of Los Angeles, used the massive CRAY 1 Computer using 200,000 watts of power, to create sequences. The cost of leasing the computer was an enormous $108,000 a month. This kind of expense makes similar projects prohibitive to television programme makers at this moment in time, but shows what could be done in the future if the cost of such technology can be reduced.

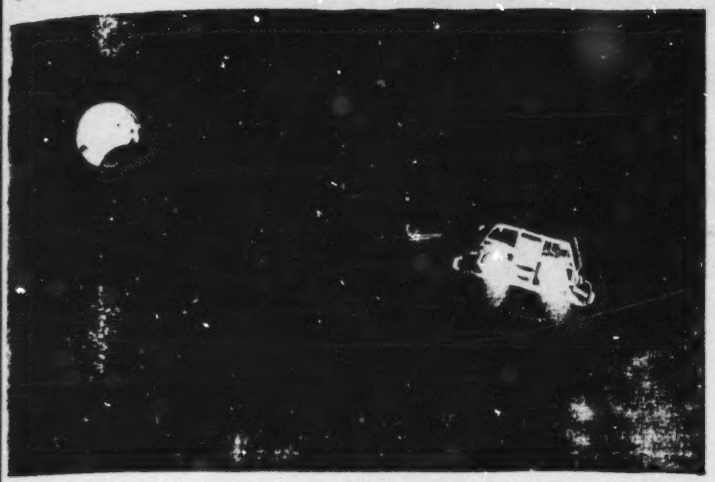


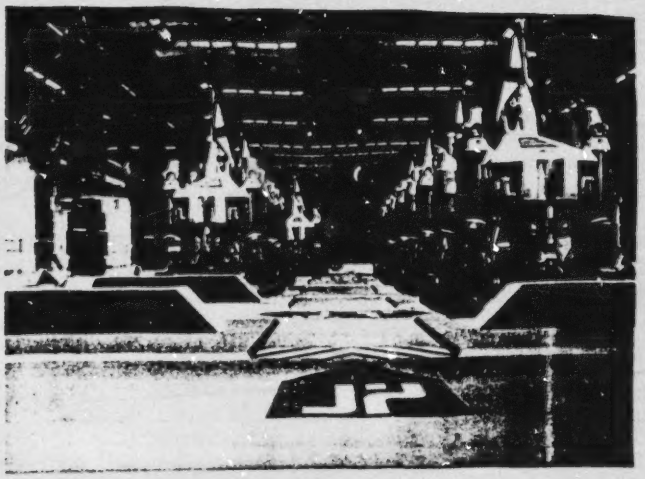


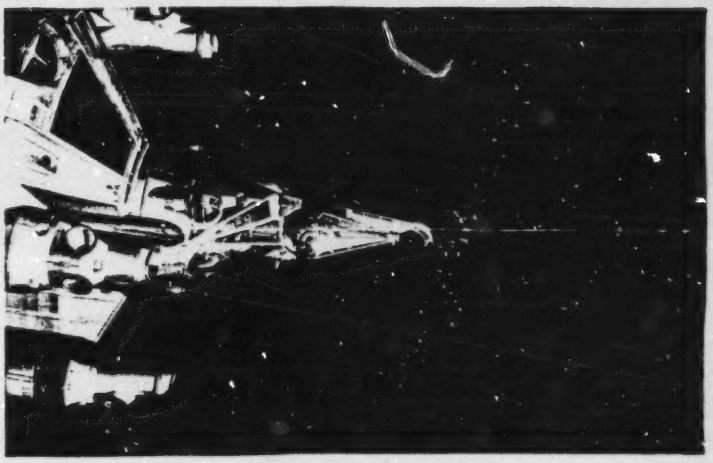
BRAIN: Computer graphics easier than filming

"THE LIVING BODY"

Computer images produced
by: CRANSTON CSURI
COLUMBUS OHIO

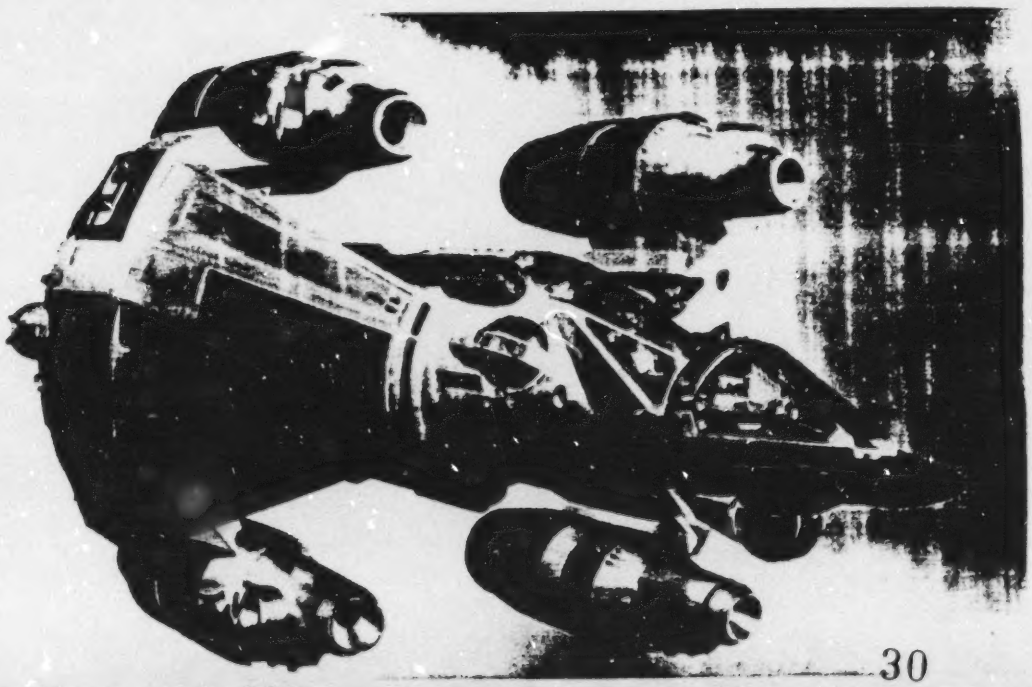






The photographs used in this article are examples of the special effects created with the use of the Cray. It is difficult to believe that these were created not with models but with figures fed into a computer. As we become more familiar with what computers will do and as more complicated computers become available, the possibilities of computer generated animation seem endless.

"THE LAST STARFIGHTER"
COMPUTER GENERATED IMAGES



BEST COPY AVAILABLE

I can envisage in years to come, Effects Designers in Educational Television using such images to replace table top models. They would be ideal for displaying Mathematical Principles and Molecular Structures, for instance.

We in the BBC/OU Partnership are already feeling the impact of computers on our output from the Visual Effects Department. Where in the past we may well have used mechanical means to make a teaching point, we are in some cases now able to save time, achieve greater accuracy, and have better control over specific demonstrations.

For obvious reasons the machine cannot replace the Effects Designer but new technology can be used to extend his or her capabilities considerably.

We have been using, for instance, computer controlled lasers to describe the paths of orbiting planets and to illustrate mathematical principles.

Our Film Rostrum unit has been 'computerised' in order to give greater control over camera work and to add the facility of memory whilst controlling passes of the camera over models and art work. Computer controlled plotters are being used to produce drawings which could otherwise take days to produce because of their complexity and the mathematics needed to arrive at the drawing.

At the time of writing, our Video Rostrum Camera Unit is likely to be replaced by a robot! It is hoped that a camera mounted on an industrial robot controlled by a

computer will give far greater flexibility than was possible with the manual Rostrum Unit. These are just a few of the influences of the computer on Visual Effects in 1984. Perhaps I could now show you some examples of this with video sequences.

EXTRACT FROM
FEASABILITY STUDY PAPER.

2) Terms of Reference

i) The objective of the study is to determine if a remotely controlled robotic system can manoeuvre a camera, in various three dimensional patterns such that the recorded image of the transition is visually smooth to the critical human viewer.

ii) It is anticipated that the transportable system will comprise a control console to programe the robot device as well as initiate and sequence all camera actions. At least 15 controllable functions can be identified, including x-y-z axis; camera zoom, iris, focus and black level; pan, tilt, roll, model x-y axis and rotation; tracking and lighting. The study will concentrate on a system for servicing a studio set of about 4 m^3 plus longtrack extension.

iii) The technical reason for the investigation, is the need for a very precise and consistent camera tracking system, such that a given object can be scanned repeatedly in three dimensions without any apparent misalignment of the different scans. This would allow a composite image to be constructed from the multiple scans, or allow the same scene to be observed from an identical viewing path over a long time period.

iv) The economic reason, is that images obtained by manual camera tracking are difficult to repeat accurately and waste resources. Existing automated devices allow smooth and accurate tracking, but only in two dimensions and one plane, therefore any 'extra' camera effects are time consuming in planning, tryouts and execution.

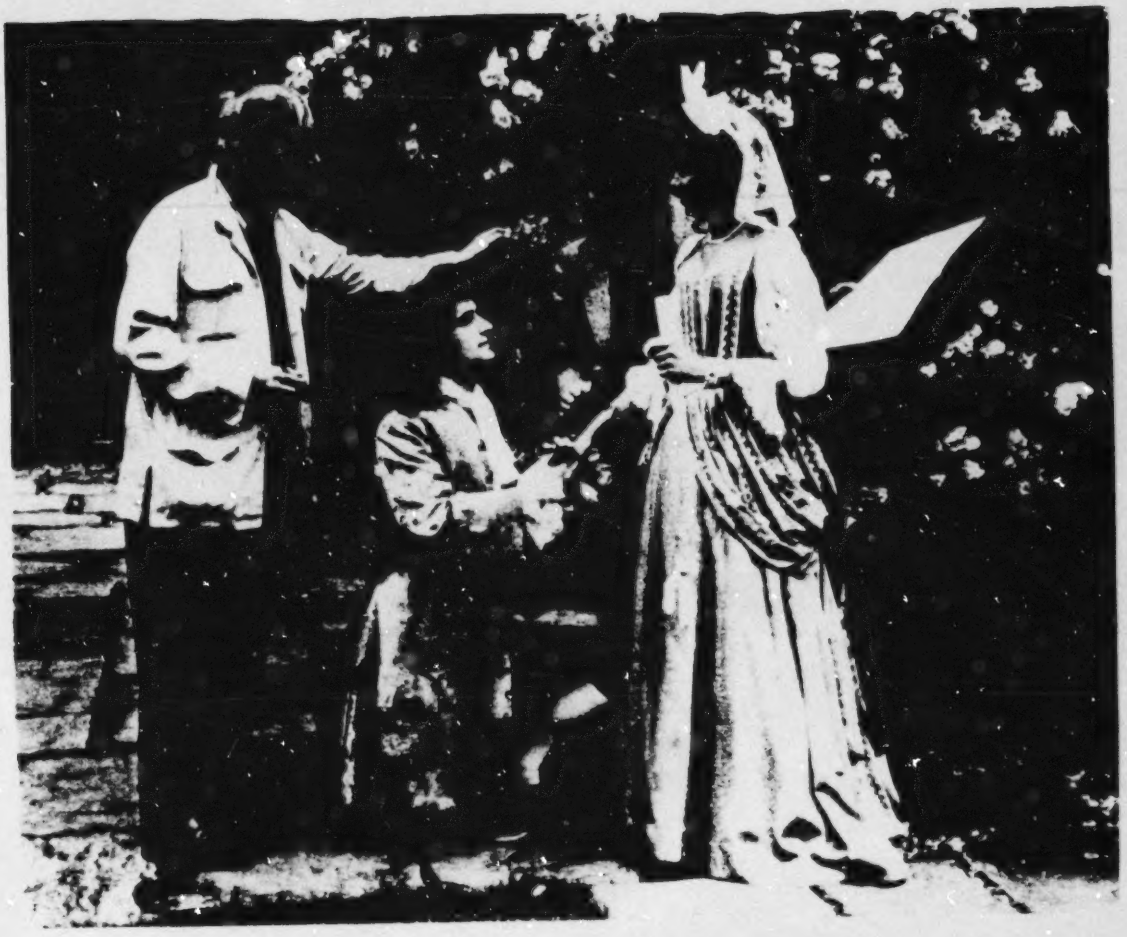
v) In general terms, the Feasibility Study will investigate and comment upon the existing methods of camera manipulation and what is desired versus what can be achieved through the correct use of robotics.

vi) Specifically, the following elements will be included within the Feasibility Study:

1) Developing a BBC task specification for the robot system in geometric, dimensional and function terms. For instance, a camera plus lens and cabling weighing about 20 kg must be able to move over any predetermined path within a 4 m^3 at a preset time between, say 3 seconds and 30 minutes. The repeatability accuracy shall not be worse than 1 part in a 1000.

D R A M A

A BBC / OU Drama Training Course in action. A young Arts director rehearses a scene with the guidance of an experienced producer from BBC Drama.



A SCENE FROM AN EARLY DRAMA PRODUCTION

DRAMA PRODUCTIONS IN EDUCATIONAL TV

Any Visual Effects Technician serving the Television aspect of any educational establishment including the Arts in its curriculum, could well expect at some time to be involved in a Drama production requiring Special Props or atmospheric effects.

This involvement would demand an abrupt shift from the academic style of working and scholastic approach, to a more free and imaginative mode, more in line with that of the Film Effects Technician.

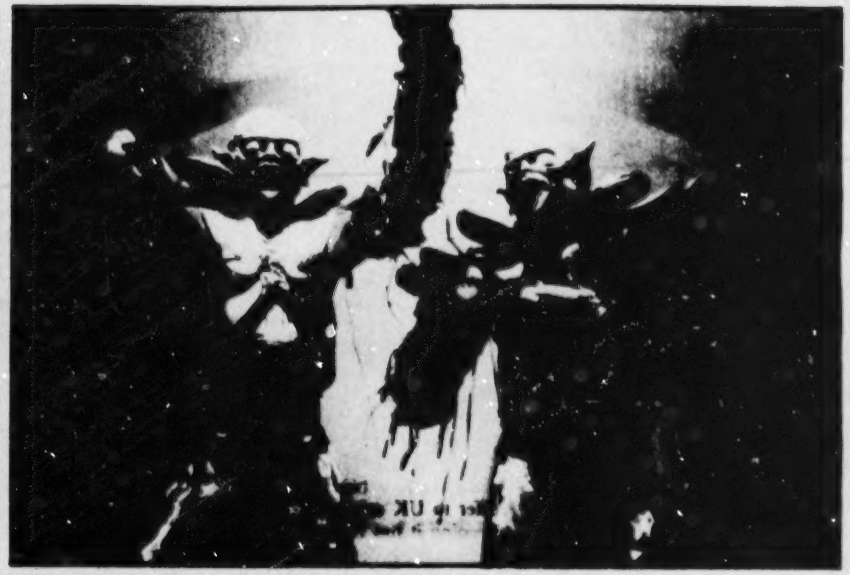
The Drama production can call for elemental effects such as fire.rain,smoke and snow. All these would be provided by our technician.

Special props may be required - the kind which cannot be purchased from stock somewhere, in fact were I to give exables, the list would be endless.

It may be necessary for our technician to produce, either with a make up artist or not, as the case may be, special Prosthetics.

Having said all this it might be more informative were I to show some examples of Dramatic effects - this I will now do.....

LUNAR Countdown created feel of a mini feature



SPECIAL moon creatures created with prosthetics technique

PROSTHETICS FOR DRAMATIC EFFECT

VIDEO SEQUENCE OF "THE GRAND INQUISITOR" WITH SIR JOHN GULGUID

In this short sequence from "The Grand Inquisitor" - a drama for the Arts Faculty - you will see how the Visual Effects Designer has added atmosphere to the production.

We start with the opening titles which burn away to reveal the set behind. The burning of the titling is not random, but is controlled by the Visual Effects Designer who has applied an inflammable gel only to those parts of the title backing he wishes to burn.

The Flambeaux you will see burning continuously through the sequence are made by Visual Effects, and with rehearsals, burned for a total of fifteen hours.

The burning brazier which you will see part of in the foreground, is not what it appears, but is a 'mock-up', made by placing coloured lamps with an integral flicker device in the circuit, surrounded by painted glassfibre insulating material in the bottom of the brazier. The final touch was added by placing lit firelighters amongst artificial coals on the surface. (Incidentally it is now possible to obtain artificial coals made from ceramics. The advantage of these being their realism and long life in use.)

There were 'torture implements' placed in the coals and these were again special props made by Visual Effects.

To follow on from "The Grand Inquisitor" I will now show you examples of special effects work for the Arts Drama "Macbeth".

Notice the decomposed body in the foreground. The objects the witches drop into the cauldron.

Other effects are the child kings' head, which appears in the mist. The dri-ice which provides the mist itself.

MOVE INTO SLIDE SEQUENCES
OF DRAMA AND END WITH
SUMMARY.

SUMMARY

THE BASIC QUALIFICATIONS THAT WE SEEK IN THE PROSPECTIVE EFFECTS MAN OR WOMAN ARE....

A FORMAL TRAINING IN ART OR DESIGN, (UNLESS IT IS A SPECIFIC SPECIALISM WE ARE LOOKING FOR) THE ABILITY TO WORK IN A RANGE OF DIFFERENT MATERIALS AND TO USE INITIATIVE.

THEY MUST HAVE THE ABILITY TO WORK AS PART OF A TEAM...TELEVISION BEING ESSENTIALLY TEAM WORK.

WHATEVER THEIR PAST EXPERIENCE, IT WILL TAKE US APPROXIMATELY TWO YEARS TO BRING THEM TO THE STANDARD REQUIRED.

THEY WILL FIND THEMSELVES SET ON A CAREER WHICH WILL CONSTANTLY TAX THEIR IMAGINATION AND CREATIVITY. THEIR WORKING LIVES WILL BE GOVERNED BY DEADLINES.

THEY WILL NEVER STOP LEARNING, AND WILL NOT HAVE TIME TO REALISE, HOW FAST TIME IS PASSING. BUT: THEY WILL BE PROVIDING A UNIQUE SERVICE TO TELEVISION POSSIBLY UNEQUALLED ELSWHERE IN THE WORLD.

THANK YOU.